

## AMENDMENTS TO THE SPECIFICATION

The paragraph beginning at page 6, line 12 has been amended as follows:

A micromachined needle array 31 according to another embodiment of the invention is shown in Figure 2B. The needle array 31 has a two-dimensional configuration with similar components as needle array 30, except that needle array 31 is formed without a coupling channel member. Accordingly, needle array 30 31 includes a plurality of microneedles 32 with microchannels therein that are dimensioned as discussed above for needle array 10. The microneedles 32 each terminate at a needle tip 33 with a channel opening 34 therein. A pair of structural support members 38 interconnect with microneedles 32. One or more input ports 37 and output ports 39 can be optionally formed in microneedles 32 to increase fluid input and output flow.

The paragraph beginning at page 9, line 6 has been amended as follows:

Figures 5A and 5B depict alternative methods of assembling two-dimensional needle arrays into three-dimensional needle array devices. In the method depicted in Figure 5A, a plurality of two-dimensional needle arrays 70 are provided which have been released from a substrate as shown for the array of Figure 2A. The needle arrays 70 are positioned in a stacked configuration with a plurality of metallic spacers 72 therebetween to define the distance between any two microneedle arrays in the stack. The stacked needle array configuration is then subjected to flash electroplating to join needle arrays 70 with metallic spacers 72 in a fixed three-dimensional needle array device 74. The

needle array device 74 can then be disposed in a machined interface structure 76 such as an acrylic interface, allowing connection to a dispensing means for injecting a liquid such as a syringe.

The paragraph beginning at page 10, line 27 has been amended as follows:

A two dimensional microneedle array was fabricated according to the procedure outlined above ~~to have~~ to have 25 microneedles. The inner dimensions of the hollow microneedles were made to be of inner cross-sectional area of  $40 \times 20 \mu\text{m}^2$  (width by height) and outer cross-sectional area of  $80 \times 60 \mu\text{m}^2$ . The needle coupling channels were 100  $\mu\text{m}$  wide, and provided fluid communication between each needle channel. Two sets of  $60 \times 100 \mu\text{m}^2$  structural supports were located 250  $\mu\text{m}$  from each needle end. Each needle channel was 2 mm long, while the width of the 25 needle array was 5.2 mm. The center-to-center spacing between individual needles was 200  $\mu\text{m}$ . The needle wall thickness was approximately 20  $\mu\text{m}$  of electroformed metal.